

Research Report 1225

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# RETENTION OF BASIC SOLDIERING SKILLS

Joyce L. Shields, Stephen L. Goldberg,  
J. Douglas Dressel

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SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

REPORT DOCUMENTATION PAGE		READ INSTRUCTIONS BEFORE COMPLETING FORM
1. REPORT NUMBER Research Report, 1225	2. GOVT ACCESSION NO.	3. RECIPIENT'S CATALOG NUMBER
4. TITLE (and Subtitle)	5. TYPE OF REPORT & PERIOD COVERED	
6. RETENTION OF BASIC SOLDIERING SKILLS,	7. PERFORMING ORG. REPORT NUMBER	
7. AUTHOR Joyce L./Shields, Stephen L./Goldberg and J. Douglas/Dressel	8. CONTRACT OR GRANT NUMBER(s)	
9. PERFORMING ORGANIZATION NAME AND ADDRESS US Army Research Institute for the Behavioral and Social Sciences, 5001 Eisenhower Avenue Alexandria, VA 22333	10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS 2Q163731A770A1	(17) AL
11. CONTROLLING OFFICE NAME AND ADDRESS US Army Training and Doctrine Command Deputy Chief of Staff for Training Ft Monro, VA 23651	12. REPORT DATE Sep 1979	(11)
14. MONITORING AGENCY NAME & ADDRESS (if different from Controlling Office) (12) 72	13. NUMBER OF PAGES 64	15. SECURITY CLASS. (of this report) Unclassified
16. DISTRIBUTION STATEMENT (of this Report) Approved for public release, distribution unlimited (14) ARI-RR-1225		
17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)		
18. SUPPLEMENTARY NOTES		
19. KEY WORDS (Continue on reverse side if necessary and identify by block number) Training Refresher Training Skill Retention Retention Predictors Performance Delay Training Nomographs		
20. ABSTRACT (Continue on reverse side if necessary and identify by block number) Field Artillery Training Center (FATC) evaluators tested soldier's performance on twenty basic common tasks. The sample included soldiers who were completing entry-level training and soldiers who had completed this entry training during the previous 12 months. Training Center evaluators rated task performance "GO" or "NO GO" for each task step and for the task as a whole. Tasks varied in the rate at which the percent "GO" declined since training. Three factors accounted for most of the differences in retention: (1) number		

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of task steps, (2) order of original training, and (3) the presence or absence of subtasks. Soldiers can perform most task steps. The steps that are forgotten tend to be those that are not suggested by the previous sequence of steps or by the equipment.

Commanders can use the research results to determine the relationship between soldier proficiency and time since training. Commanders can schedule training to maintain desired levels of proficiency in critical skills. The eventual research goal is to develop guidelines for determining which tasks require frequent training and which tasks can be maintained at high proficiency for long periods without practice.

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# **RETENTION OF BASIC SOLDIERING SKILLS**

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Office, Deputy Chief of Staff for Personnel  
Department of the Army

**September 1979**

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Army Project Number  
2Q163731A770

**Performance-Based Training**

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## FOREWORD

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The Training Technical Area of the Army Research Institute for the Behavioral and Social Sciences (ARI) has actively pursued a program of research in support of the systems engineering of training. A major focus of this research is to develop the fundamental data and technology necessary to field integrated systems for improving individual job performance. Such systems include Skill Qualification Testing (SQT), job performance aids, training courses in schools and in the field, performance criteria, and management and feedback systems. This report is one of a series on specific topics in the area of skill retention. ARI Technical Paper 313 provided a review of the general area; ARI Research Report 1205 investigated the acquisition and retention of selected Chaparral skills and ARI Research Report 1211 investigated retention and relearning of typewriting skills. The long-term goal is to develop a method for predicting the rate of proficiency loss for all types of skills, in response to requirements by the Deputy Chief of Staff for Training of the Army Training and Doctrine Command (TRADOC). The work was accomplished by ARI personnel under Army Project 2Q163731A770, FY 1978, "Performance-Oriented Individual Skill Development and Evaluation" for the Deputy Chief of Staff for Training, TRADOC, with the combined support of the US Army Field Artillery Training Center; its Test Evaluation and Analysis Section; III Corps, Artillery; and the Commander, US Army Field Artillery Center, Ft Sill, OK.

  
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## BRIEF

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### Requirement:

Identify task factors which influence the rate of skill decay of basic Army tasks.

### Procedure:

Field Artillery Training Center (FATC) evaluators tested soldiers' performance on twenty basic common tasks. The Training Center teaches these tasks in Basic Training and One Station Unit Training; they are also listed in Skill Level 1 Field Artillery Soldier's Manuals. The sample included soldiers who were completing entry-level training and soldiers assigned to III Corps Artillery at Ft Sill who had completed entry training during the previous 12 months. Training Center evaluators rated task performance "Go" or "No Go" for each task step and for the task as a whole.

### Findings:

Tasks varied in the rate at which the percent "Go" declined since training. Three factors accounted for most of the differences in retention: (1) number of task steps, (2) order of original training, and (3) the presence or absence of subtasks. Soldiers who received No Gos for the task did not forget the whole task. They can perform most task steps. The steps that are forgotten tend to be those that are not suggested by the previous sequence of steps or by the equipment. In weapon tasks, soldiers either tend not to perform or perform incorrectly the safety procedures.

### Utilization of Findings:

Commanders can use the results of the research to determine the relationship between soldier proficiency and time since training. Commanders can schedule training to maintain desired levels of proficiency in critical skills. Future research is planned to determine the consistency with which the factors identified in this research can predict retention of other Army tasks. The eventual goal is to develop guidelines for determining which tasks require frequent training and which tasks can be maintained at high proficiency for long periods without practice.



# RETENTION OF BASIC SOLDIERING SKILLS

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## RETENTION OF BASIC SOLDIERING SKILLS

### INTRODUCTION

Assuming the next armed conflict will be a "come as you are" war, soldiers will not have time to significantly improve skills before entering combat. Thus, the Army seeks to maintain critical skills at as high a level as possible at all times. The adage "once trained, always trained" is a recognized myth. One only has to look at Skill Qualification Test results to be convinced that Army job skills deteriorate. However, little is known about skill deterioration or retention for specific Army jobs. ARI is conducting research to alleviate this problem.

Tasks vary in how difficult they are to learn and how quickly they are forgotten. The rate of proficiency loss has implications for training, training literature, on-the-job aids and hardware design (Schendel, Shields, and Katz, 1978). Since it is impractical to measure retention for each Army task, ARI is conducting research to identify variables or task factors which predict rates of proficiency loss for Army tasks. Recent research projects within ARI's program concern the acquisition and retention of selected Chaparral Missile Crewmen skills (Shields, Joyce and Van Wert, 1978), the retention of typewriting skills (Hagman, 1979) and the present research on retention of basic soldiering skills learned in initial training. Schendel, Shields and Katz (1978) recently reviewed research on retention of motor skills. Such factors as the level of original learning, the organization and structure of tasks were found to relate to the rate of proficiency loss. Vineberg (1975) showed that performance of basic soldiering skills deteriorated rapidly over a six-week interval. Vineberg suggested the need for a longer term study to determine the amount and timing of refresher training soldiers need to meet Army performance standards. In the present research on basic skills retention, performance is measured up to one year after training.

### OBJECTIVES

The objectives of this research were to (1) evaluate soldiers' retention of basic skills learned in initial training and (2) determine how task factors affect skill retention.

### PROCEDURES

Researchers evaluated soldiers' performance on twenty tasks taught in Basic Training (BT) and One-Station Unit Training (OSUT) and listed in Skill Level One Soldier's Manuals. The Field Artillery Training Center (FATC) administers a standard performance test at the end of Basic Training and One-Station Unit Training. This test was used to evaluate one sample of soldiers immediately following their entry train-

ing and another sample who had attended FATC for either OSUT or BT and were assigned to III Corps Artillery at Ft Sill. FATC evaluators rated each soldier from both samples "GO" or "NO GO" on total task performance and on each step within a task. Appendix A lists the tasks and task steps tested. To pass the task and receive a "GO" a soldier had to correctly complete all task steps. If the soldier did not pass all task steps he received a "NO GO" on that task. Prior to testing, soldiers completed a questionnaire about their general background and training experience.

## RESULTS

The performance data of soldiers reporting no practice or training following initial training were analyzed to determine (a) the percent of soldiers performing each task to criterion (% GO), (b) the average percent of task steps performed correctly, and (c) the type of performance steps missed in each task.

### Percent Soldiers Correctly Performing Entire Task

Performance on all tasks declined after periods of no practice in the unit. The changes in percent "GO" over time for a sample of the twenty tasks are plotted in Figure 1. An obvious but important point from this figure is that performance on some tasks changes at a faster rate than others. For example, approximately 6 months after initial training 85% of the soldiers could perform correctly the task "report enemy information" while less than 55% could perform the task "don the gas mask" to task criterion. Three factors accounted for most of the differences in retention:

- Number of task steps;
- order or original training, and
- subtask structure

Number of steps in a task was the single best predictor of the decrease in percent "GO" over time. Tasks without subtasks were better retained than those with subtasks. For example, for the task "perform cardiopulmonary resuscitation" soldiers performed the cardiac massage but forgot to perform the mouth-to-mouth resuscitation portion of the task on the mannequin. In another finding, it was determined that the earlier a task was first trained in the training cycle the better it was retained over time. This is probably related to the way entry-level training is conducted at the FATC. Specifically, the initial training received is practiced throughout the Basic Training/or One Station Unit Training cycle. Therefore, the earlier training of a task is given the more likely it will be practiced more than one given at a later time.

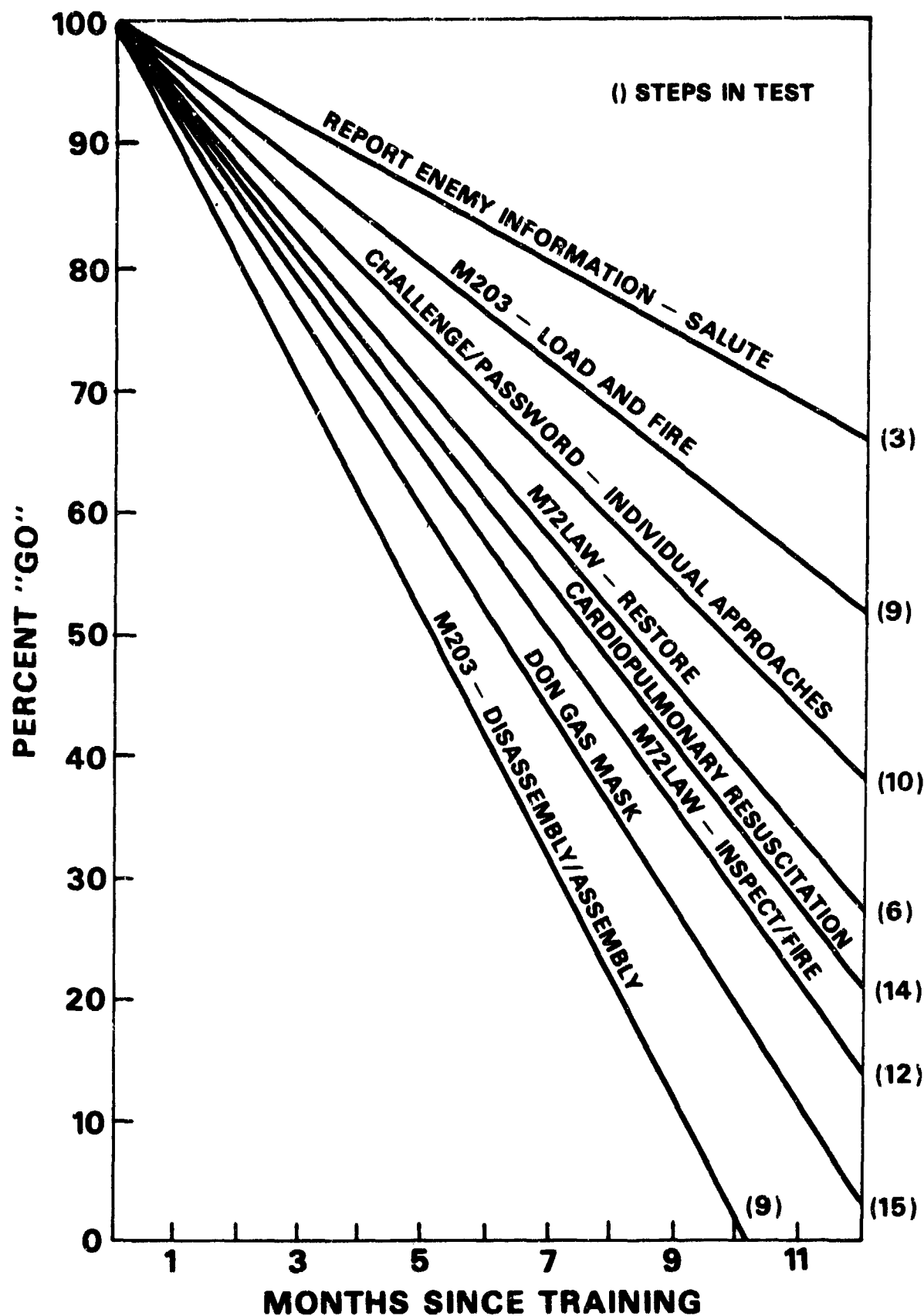


Figure 1. Changes in percent "GO" over time since training

### Percent of Task Steps Passed

The rapid decrease in the percent of soldiers performing the whole task to criterion suggests a need for frequent training to maintain proficiency (Figure 1). Also it should be noted that a "NO GO" for the overall task does not mean the soldier forgot how to perform all steps. In fact, the average percent of performance steps correctly performed for each task decreased slowly. Soldiers receiving a "NO GO" do remember how to perform most steps, but cannot perform the entire task correctly. The average number of task steps passed is plotted in Figure 2 for a representative sample of the twenty tasks evaluated. Unfortunately, some steps are critical and having a high average does not result necessarily in satisfactory performance. The only task factor related to percent steps correctly performed was order of original training.

### Type of Performance Step Missed

The experimenters examined all tasks to determine if there were consistencies in the types of steps that were most frequently missed. This subjective examination revealed a consistency in the types of errors made. In general, soldiers tended to forget steps not suggested by the previous sequence or by the equipment. For example, in weapons tasks soldiers fail to perform safety procedures. If a weapon should be cleared as part of the procedure such as assembly/disassembly of the M16 rifle there was a high probability that the soldier would forget to clear the weapon. Similarly, soldiers correctly performed most steps associated with the Light Anti-Tank Weapon (LAW). However, in the test situation, soldiers frequently forgot the very important safety procedure of checking the backblast area so that fellow soldiers are not killed or wounded as the LAW is fired. Table 1 shows the type errors that frequently were made. Therefore, to insure performance of these steps either changes in training will have to be made, job aids used, or equipment redesigned.

### CONCLUSIONS

Commanders and training developers can use this research to strengthen entry-level and unit training.

As noted in the introduction, the level of original learning is a strong predictor of retention. Results of this research indicate that performance on tasks introduced early in entry-level training and practiced throughout were retained better over time. Therefore, entry-level trainers may want to increase the number of practice repetitions. In addition, the consistency in the types of errors soldiers make suggests that entry-level trainers should develop training strategies that emphasize safety procedures and task steps that are either unrelated to hardware or the previous sequence of steps.

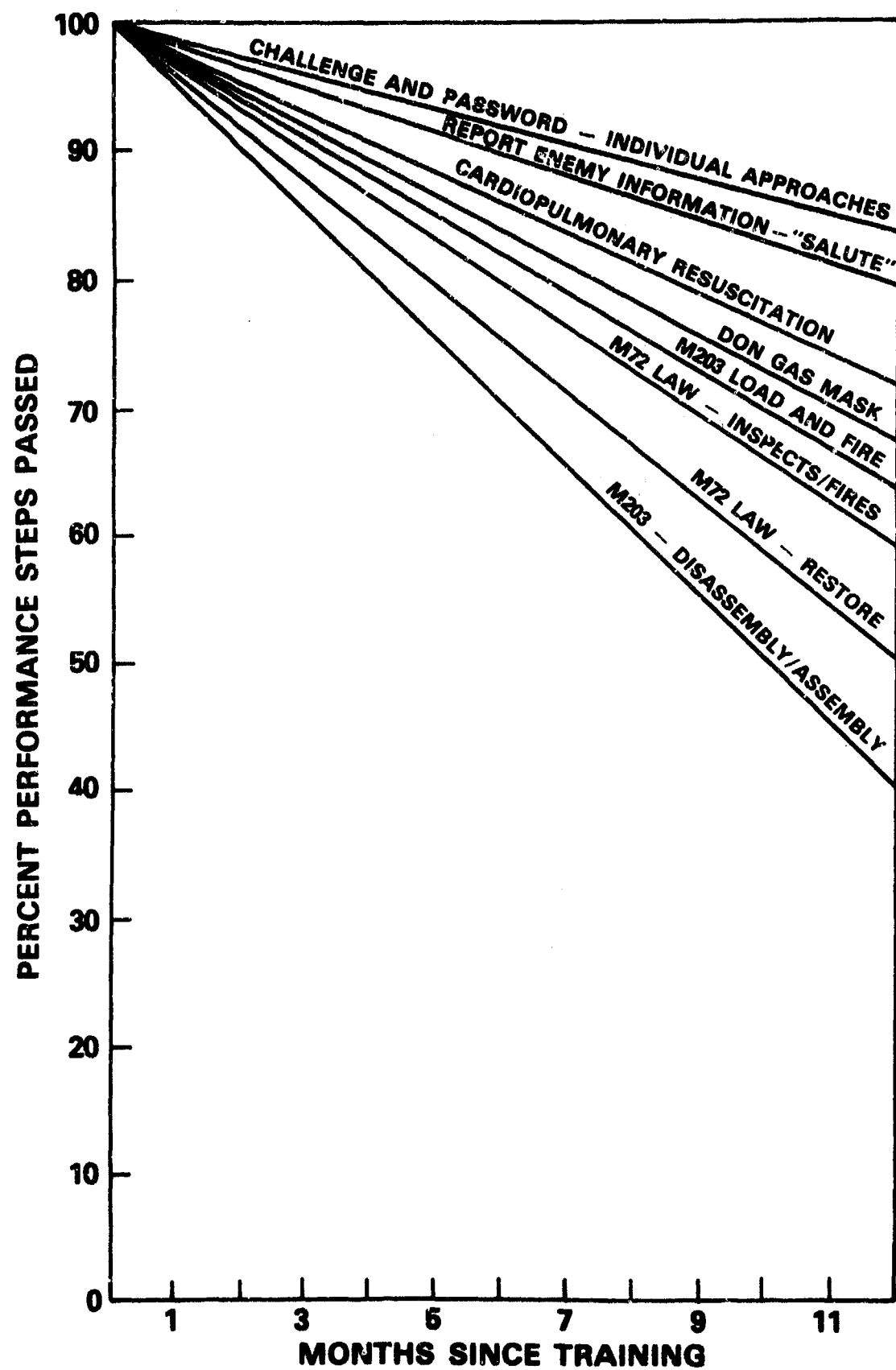


Figure 2. Changes in percent of performance steps passed over time since training



TABLE 1

## Percent "GO" for M72A2 LAW Performance Measures

<u>Performance Steps</u>	<u>Percent GO</u>
1. Inspects LAW to insure all seals intact and tube not cracked, punctured, or crushed	87
2. Insures pull pin in place	86
3. Insures trigger safety handle in place	83
4. Faces in general direction of target	83
5. Inspects to assure that backblast area is clear of personnel	39
6. Removes pull pin	84
7. Rotates cover downward	84
8. Sharply extends launcher until it locks into place	78
9. Rechecks backblast areas	41
10. Places launcher on shoulder	84
11. Supports outer tube with nonfiring palm up	68
12. Moves safety to arm	64

Commanders can use the information in Figure 1 to determine the numerical relationship between soldier proficiency and time since training. When used in this manner Figure 1 becomes a "training nomograph." That is, a commander can use the information in this figure to:

- determine the approximate frequency of testing and retraining to maintain a specified level of task proficiency, or
- estimate a unit's level of proficiency after varying periods of no practice.

For example, looking at the nomograph, if a commander wants at least 50% of his soldiers to perform Cardiopulmonary Resuscitation (CPR) perfectly at all times, he must test and retrain semi-annually. On the other hand, if a commander wants to estimate CPR training proficiency after 9 months of no practice, his best estimate would be that 40% of his soldiers could perform the task perfectly.

Proficiency loss for the basic soldiering tasks evaluated in this research is related to three task factors (number of task steps, subtask structure and order of original training). Future research is planned to determine how consistently these factors account for proficiency loss. It should be noted, that the lines in the training nomograph represent simplified descriptions of the rates of proficiency loss. The nomograph is designed for making gross training scheduling decisions.

If these factors predict retention of other Army tasks, then generalized training nomographs that describe classes of Soldier's Manual tasks can be developed. A generalized nomograph is pictured in Figure 3. Guidelines will be developed so that training developers and equipment designers can determine which tasks will require frequent training and which tasks can be maintained at a high level of proficiency over extended periods with no practice. This information will be used to designate task type for use in the training nomograph. These nomographs will provide realistic estimates of training readiness given a unit's training history. They are descriptive, not prescriptive. Commanders and trainers can then make their own decisions about which training to conduct and when. The commander knows what demands proficiency requirements make on his resources. He can use the training nomograph to estimate trade offs between readiness and resources.

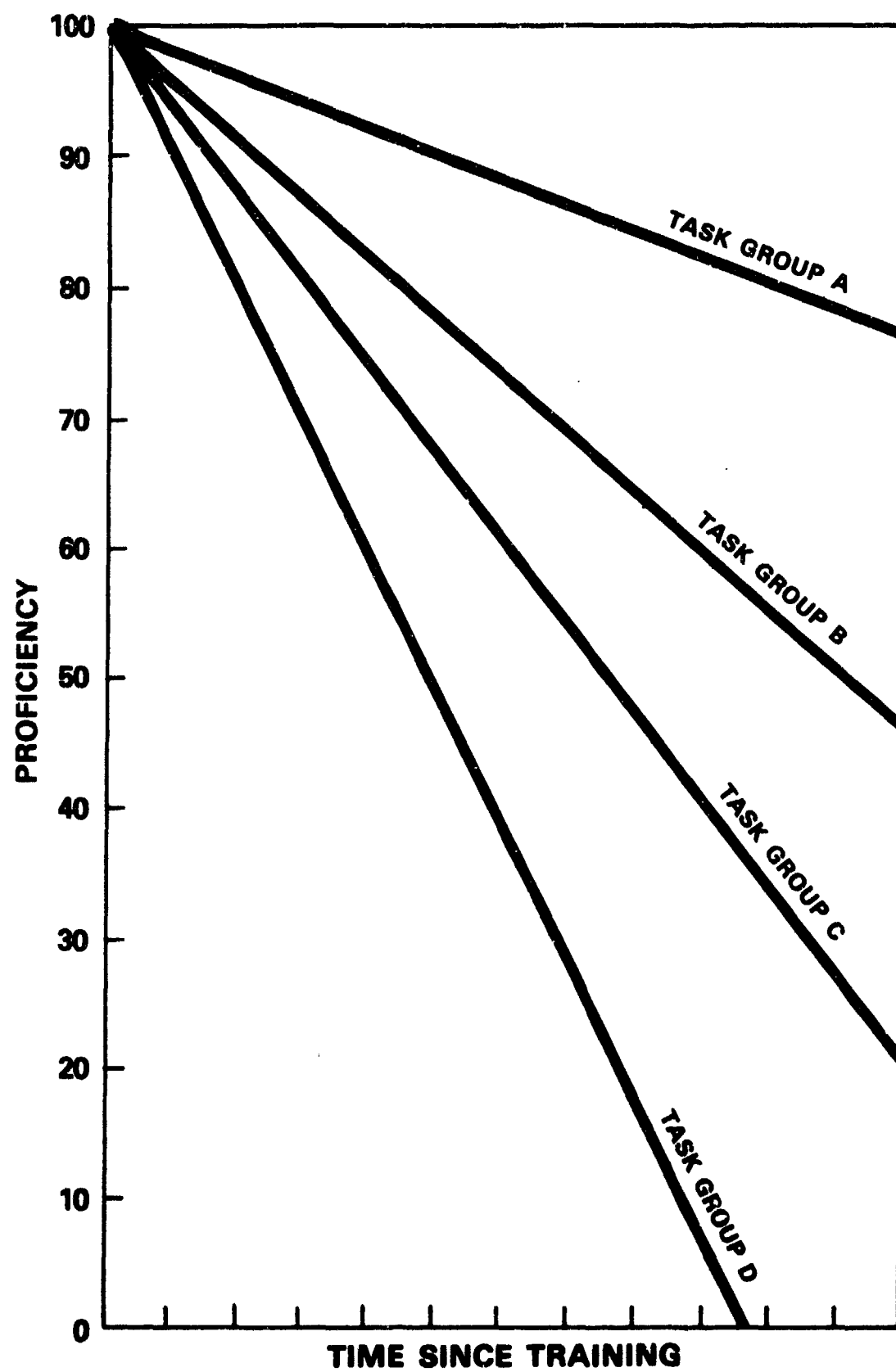


Figure 3. A generalized training nomograph

## TECHNICAL SUPPLEMENT

### RETENTION OF BASIC SOLDIERING SKILLS

#### METHOD

##### Subjects

The participants were 523 soldiers who graduated from either Basic Training (BT) or One Station Unit Training (OSUT) at Ft Sill, Oklahoma. One hundred eighty-two soldiers were trainees taking the end of course test and 341 were returning soldiers who graduated during the previous 12 months. Each soldier performed the end of course test once during the five weeks of data collection.

##### Performance Tests

The 20 tasks used for this evaluation appear in both the 13B Soldier's Manual and the Variable Test Package (VTP) developed by the Field Artillery Training Center (FATC). The task tests were the standard end of course performance tests used by the FATC. ARI researchers divided each task into its component steps. Each step represented a single discernible action in the task sequence. Appendix A contains a list of tasks and their component steps.

We abbreviated the task steps and designed computer compatible data sheets. The Training Center noncommissioned officer (NCO) evaluators scored each task step either GO or NO GO. When a soldier failed to perform a step or performed it incorrectly, he received a NO GO for the step and a NO GO for the task.

##### Questionnaire

Each of the 341 returning graduates completed a questionnaire at the start of the experiment. The questionnaire elicited demographic information including date of BT/OSUT graduation, recency of task performance, frequency of task performance and confidence in task performance. The questionnaire appears in Appendix B.

##### Design

We used a cross-sectional time series design to measure task proficiency as a function of months since training. Evaluators tested a different sample of soldiers for each combination of experimental condition and time period. The design is shown in Table 2.

Table 2

Experimental Design for Skill Retention Research. Each X represents a different sample of soldiers.

Experimental Condition	Months Since Training												
	0	1	2	3	4	5	6	7	8	9	10	11	12
Coaching	$x_1$				$x_2$	$x_3$	$x_4$	$x_5$	$x_6$	$x_7$	$x_8$	$x_9$	$x_{10}$
No Coaching					$x_{11}$	$x_{12}$	$x_{13}$	$x_{14}$	$x_{15}$	$x_{16}$	$x_{17}$	$x_{18}$	$x_{19}$

### Procedure

#### Current Graduates

The current BT/OSUT graduates received the standard end of course testing with performance evaluation on a step by step basis as well as a task basis. Prior to testing soldiers received instruction from their Drill Sergeants. The instruction consisted primarily of task demonstration with emphasis on steps which frequently are missed. The soldiers then had a short practice period. After the warm-up period, soldiers entered the county fair testing circuit. The county fair testing circuit winds through a woods and has ten testing stations. At each testing station one or two Training Center evaluators told the soldier which task to attempt and recorded his performance. When a soldier failed a step, the evaluator corrected the soldier and told him to complete the task.

#### Returning Graduates

Returning BT/OSUT graduates first completed questionnaires. The soldiers were then randomly divided into two groups. One group immediately started the testing circuit and task evaluation at each test station. The other group received a brief period of coaching before testing. The coached groups received instructions similar to those described above. Drill Sergeants demonstrated how each task was performed with emphasis on steps frequently missed. The coaching did not include any hands-on practice by the returning graduates. After the brief coaching, usually less than 30 minutes in total, the group started the testing circuit. When the returning graduate failed a step, the Training Center evaluator recorded a step NO GO, corrected the soldier and told him to continue the task.

## RESULTS

### Demographic Information

The 341 soldiers in the sample of returning FATC graduates were relatively homogeneous. Soldiers were approximately the same age, and held the same ranks. Over 99% of the sample held the rank of E-3 or below; 6.5% were E-1, 66.3% were E-2, and 26.3% were E-3. Less than 1% of the sample were E-4.

Three quarters of the examinees were age 20 or below; 26.6% were age 17-18, 47.3% were age 19-20, 14.8% were age 21-22, and 10.1% were 23 or above.

The majority of the sample reported either graduating from high school or completing high school equivalency program (64.2%). Of those, 9.8% reported obtaining some college experience.

The majority of the examinees (56.5%) received One Station Unit Training at Ft Sill and the Military Occupational Specialty (MOS) 13B10, Cannon Crewman. The remainder of the sample attended Basic Training followed by Advanced Individual Training, and received a variety of field artillery MOSs. Table 3 presents the MOSs represented in the sample and the number of returning graduates holding each MOS.

Examinees in the returning graduates group graduated an average of 7.75 months prior to participating in the research. There were very few soldiers who had less than five months between OSUT/AIT graduation and reevaluation. Because of the small numbers in the 0-5 months groups, they were dropped from the overall sample. Table 4 presents the sample size by months since graduation.

The Military Personnel Center supplied Mental Category data for all but 27 of the sample. There were 2.9% in Category I, 13.8% in Category II, 66% in Category III, and 9.4% in Category IV. Seventy-seven percent of those in Category III were in the lower half of Category III (Category IIIB). The small numbers of soldiers in Mental Categories I, II and IV prevented us from using mental category as a control variable in other analyses.

In summary, the soldiers tested were under 20 years old, rank of E-2 or E-3, high school graduates, in Mental Category III. This pattern appears representative of first term combat arms soldiers.

### Task Experience

Returning soldiers rated the recency and frequency of training on basic skills tasks and their confidence in being able to perform the tasks to standard. The results are presented in Tables 5, 6 and 7.

TABLE 3  
MOSs of Returning Graduates

<u>MOS</u>	<u>N</u>
13B Cannon Crewmen	199
13E Cannon Fire Support Specialist	7
15D Lance Missile Crew Member	11
15E Pershing Missile Crew Member	29
17C Field Artillery Target Acquisition Specialist	23
31V Tactical Communications Systems Operator/Mechanic	3
82C Field Artillery Surveyor	55
No Response	14

TABLE 4

Number of Months Since Graduation for Returning Graduates

<u>Months Since Graduation</u>	<u>N</u>
5	53
6	76
7	51
8	27
9	69
10	21
11	13
12	<u>31</u>
	341



TABLE 5

Percent of Returning Graduates by  
Number of Task Training/Performances  
Since Graduation

<u>Task</u>	<u>Number of Performances</u>				
	0	1 - 4	5 - 10	11 - 15	16 or more
Cardiopulmonary Resuscitation	37	41	14	4	4
Stop Bleeding	40	41	12	6	1
Challenge and Password	42	29	16	6	8
Report Enemy Information	58	27	9	3	3
Don Gas Mask	29	39	18	7	6
Individual Defensive Position	58	26	10	2	4
M60 Machine Gun	45	35	12	5	3
M203 Grenade Launcher Disassemble/Assemble	51	29	12	3	5
M203 Grenade Launcher Load/Fire/Clear	56	29	10	3	2
M72 Light Anti-tank Weapon	60	27	10	2	1
M16 Rifle Disassemble/Assemble	25	32	18	10	16
Check TA312/PT Field Telephone	43	28	14	6	9
MEAN	45	32	13	5	5

TABLE 6

Percent of Returning Graduates by  
Recency of Task Training/Performance  
Since Graduation

<u>Task</u>	<u>Recency of Training</u>				
	Never	Last Summer	Last Fall	Last Winter	This Spring
Cardiopulmonary Resuscitation	33	11	8	24	24
Stop Bleeding	35	12	7	24	23
Challenge and Password	36	13	8	20	24
Report Enemy Information	50	13	7	18	12
Don Gas Mask	24	10	7	25	34
Individual Defensive Position	52	13	8	16	11
M60 Machine Gun	36	11	8	25	20
M203 Grenade Launcher Disassemble/Assemble	43	12	8	18	19
M203 Grenade Launcher Load/Fire/Clear	48	11	8	19	14
M72 Light Anti-tank Weapon	51	12	8	19	10
M16 Rifle Disassemble/Assemble	20	9	7	25	40
Check TA312/PT Field Telephone	39	8	7	19	26
MEAN	39	11	8	22	20

TABLE 7

Percent of Returning Graduates by  
Confidence Ratings for Task Performance

<u>Task</u>	<u>Confidence Rating</u>			
	Not Familiar	Perform Not Very Well	Perform Fairly Well	Perform Very Well
Cardiopulmonary Resuscitation	2	15	72	12
Stop Bleeding	2	16	71	11
Challenge and Password	3	14	59	24
Report Enemy Information	9	18	53	20
Don Gas Mask	6	24	56	15
Individual Defensive Position	10	20	52	18
M60 Machine Gun	10	28	51	11
M203 Grenade Launcher Disassemble/Assemble	9	19	51	21
M203 Grenade Launcher Load/Fire/Clear	10	25	49	16
M72 Light Anti-tank Weapon	12	25	51	12
M16 Rifle Disassemble/Assemble	2	10	49	40
Check TA312/PT Field Telephone	13	19	47	21
MEAN	7	19	54	21

There was a large percentage of soldiers who claimed never to have trained on a given task since graduating from entry training. The percent in this category ranged from 60% who had not trained on the M72 LAW to 25% who claimed no training on disassembling/assembling the M16 rifle. Across all of the tasks 44% was the no training average. On the average 73% of the sample felt that they could perform the task either fairly well or very well. The percent reporting fairly well or very well ranged from 62% for M60 machine gun tasks to 89% for disassembling and assembling the M16 rifle.

### Performance Results

#### Percent Soldiers Correctly Performing the Entire Task - PERCENT GO

Table 8 presents the percent "GO" on each task for the returning graduates group and the current graduates group. The returning graduates are further broken down to those receiving coaching and those not receiving coaching. In only one case, reporting enemy information, did the performance of the returning graduates approach that of the current graduating trainees. The current graduates average 91 percent "GO" for all the tasks, while the returning graduates' average was 42 percent.

We performed a series of regression analyses to determine the rate at which percent GO decreased for each task. The analyses include only soldiers who reported never practicing or receiving training on a task since graduation from OSUT or Basic Training, and the current graduates. Table 9 presents the number of soldiers from the returning graduates group who met the no practice criteria for each task, the number of current graduates evaluated per task, and the total number tested.

Table 10 presents the linear models which best describe the relationship of time since training to successful task performance. The slopes of these lines represent the decrement in percent GO per month. For example, "Stop Bleeding" has a slope of  $-.085$ . Given an  $8\frac{1}{2}\%$  decrement in percent GO each month, six months after training we would predict that about fifty percent of those trained could still perform the task successfully. All the slopes show a decrement in performance over time. Each of the regression equations, except one, was significant to at least the  $P < .01$  level. The Report Enemy Information Task "UTE" was significant to the  $P < .05$  level. Complete regression equations for percent GO as a function of time since training are included as Appendix C.

Although several of the tasks had significant quadratic components, they are not reported because the small increase in explained variance due to the quadratic component is offset by the ready comparisons that can be made between linear functions.

TABLE 8  
Percent "GO" of Soldiers Evaluated

<u>Task</u>	Current Graduates	Returning Graduates (RG)	RG No Coaching	RG Coaching
Cardiopulmonary Resuscitation	81	14	17	12
Stop Bleeding	79	20	12	27
Challenge and Password				
One Man Approaches	96	54	51	56
Group Approaches	96	31	28	33
Report Enemy Information				
Size/Activity/Location	95	83	78	88
Unit/Time/Equipment	93	88	81	96
Don Gas Mask	80	18	14	58
Individual Defensive Position-				
Outline	96	23	11	33
Describe	100	22	22	21
M60 Machine Gun-Load/Fire	88	21	20	21
M60 Machine Gun-Reduce Stoppage	96	47	49	46
M60 Machine Gun-Unload/Clear	92	24	17	30
M203 Grenade Launcher-Disassemble/ Assemble	100	34	24	45
M203 Grenade Launcher-Load/Fire	89	71	64	76
M203 Grenade Launcher-Reduce Stoppage	95	53	38	64
M203 Grenade Launcher-Clears	97	62	62	61
M72 Light Anti-tank Weapon (LAW)				
Inspect/Fire	80	33	26	39
M72 LAW - Restore	95	57	53	60
M16 Rifle-Disassemble/Assemble	78	35	26	43
Communications Check	94	51	45	71
MEAN	91	42	37	49

TABLE 9

## Number of Soldiers Evaluated in Each Task

<u>Task</u>	<u>Total</u>	<u>Current Graduates</u>	<u>Returning Graduates (RG)</u>	<u>RG No Coaching</u>	<u>RG Coached</u>
Cardiopulmonary Resuscitation	229	94	135	69	66
Stop Bleeding	237	75	162	88	74
Challenge and Password					
One Man Approaches	263	90	173	91	82
Group Approaches	233	67	166	84	82
Report Enemy Information					
Size/Activity/Location	341	155	186	100	86
Unit/Time/Equipment	350	160	190	97	93
Don Protective Mask	342	165	177	87	90
Individual Defensive Position					
Outline	251	82	169	90	79
Describe	256	85	171	85	86
M60 Machine Gun-Load/Fire	328	56	272	143	129
M60 Machine Gun-Reduce Stoppage	343	56	287	149	138
M60 Machine Gun-Unload/Clear	349	61	288	149	139
M203 Grenade Launcher-Disassemble/ Assemble	252	93	159	76	83
M203 Grenade Launcher-Load/Fire	241	70	171	93	78
M203 Grenade Launcher-Reduce Stoppage	220	58	162	90	72
M203 Grenade Launcher-Clears	252	93	159	75	84
M72 Light Anti-tank Weapon (LAW)					
Inspect/Fire	505	176	329	168	161
M72 LAW - Restore	500	173	327	169	158
M16 Rifle-Disassemble/Assemble	251	36	215	117	98
Communications Check	487	176	311	155	156

TABLE 10

Linear Regression Coefficients: "GO RATE" With Time Since Training

<u>TASK</u>	<u>SLOPE</u>	<u>r</u>	<u>R<sup>2</sup></u>
Cardiopulmonary Resuscitation	-.065	.46	.21
Stop Bleeding	-.085	.59	.35
Challenge and Password			
One Man Approaches	-.051	.50	.25
Group Approaches	-.079	.71	.50
Report Enemy Information			
Size/Activity/Location	-.028	.33	.11
Unit/Time/Equipment	-.014	.17	.03
Don Gas Mask	-.079	.46	.21
M60 Machine Gun			
Load/Fire	-.085	.73	.53
Reduce Stoppage	-.076	.65	.42
Unload/Clear	-.079	.69	.47
M203 Grenade Launcher			
Disassemble/Assemble	-.098	.84	.70
Load/Fire	-.040	.41	.17
Reduce Stoppage	-.079	.73	.54
Clear Launcher	-.031	.44	.19
M72 Light Anti-tank Weapon (LAW)			
Inspect/Prepare to Fire	-.071	.57	.32
Restore Launcher	-.060	.59	.35
M16 Rifle Disassemble/Assemble	-.062	.51	.26
Communications Check	-.06	.57	.33

### Predicting Rates of Decay

As noted by Schendel, et al., (1978) both task characteristics and training methods affect skill retention. We attempted to relate differences in the rates of task performance decay to task characteristic variables and task training variables, and then weigh the most effective variables in a composite prediction equation. We dropped two tasks from the analyses (outline and describe defensive positions) because they did not test performance. Instead, they required soldiers to recall a series of facts about defensive positions.

The task characteristics variables used were: number of steps in the task; whether tasks had safety procedure steps; and whether tasks could be broken into subtasks. The task training variables were: the serial order in which the tasks were trained; and a rating of the number of repetitions each task received during training. We estimated the latter variable from data compiled by one of the Training Battalions at the Field Artillery Training Center. Table 11 summarizes the values for each of the variables for each of the basic skills tasks. Table 12 presents the intercorrelation matrix for the dependent variable, slope of the percent GO performance decay function, and the five potential predictor variables.

We performed a stepwise multiple regression analysis predicting task percent GO slopes from the five task characteristics, and task training variables. The number of steps in the task was the first variable in the equation accounting for approximately 25% of the variance using the adjusted  $R^2$  figure. The order of training, and the presence of subtask variables also contributed significantly to the prediction equation, adding 16 and 22 percent respectively to explained variance. The remaining two variables, presence of safety steps and number of training exposures, did not contribute. Given the above results the following equation best predicts the slope of the successful performance decay function for a given task:

$$Y = -.25X_1 - 1.5X_2 - 2.5X_3 + C$$

Where Y = slope of performance decay function

C = the intercept parameter

$X_1$  = number of steps in the task

$X_2$  = order in original training where  $X_2 = 1, 2, 3$  or 4

$X_3$  = presence of subtask structure where  $X_3 = 0$  or 1

The equation formed from the three predictor variables has a multiple R of .84. The  $R^2$  or percent of variance accounted for was .64 when adjusted for shrinkage. This figure is probably conservative since the predictor variables had fixed values.



TABLE 11

## Value of Criterion and Predictor Variables by Task

TASK	Predictor Variables					
	<u>SLOPE*</u>	<u>STEPS</u>	<u>SUBTASKS</u>	<u>SAFETY PROCEDURES</u>	<u>ORDER OF TRAINING</u>	<u>TRAINING EXPOSURES</u>
Cardiopulmonary Resuscitation	-.065	14	YES	NO	1	2
Stop Bleeding	-.085	9	YES	NO	1	2
Challenge and Password						
One Man Approaches	-.051	10	NO	NO	2	3
Group Approaches	-.079	12	YES	NO	2	3
Report Enemy Information						
Size/Activity/ Location	-.028	3	NO	NO	1	2
Unit/Time/Equipment	-.014	3	NO	NO	1	2
Don Gas Mask	-.080	15	NO	YES	2	3
M60 Machine Gun						
Load/Fire	-.085	9	NO	YES	4	4
Reduce Stoppage	-.071	4	NO	NO	4	4
Unload/Clear	-.079	11	NO	YES	4	4
M203 Grenade Launcher						
Disassemble/Assemble	-.098	4	YES	NO	2	2
Load/Fire	-.040	9	NO	YES	2	2
Reduce Stoppage	-.079	10	NO	YES	2	2
Clear Launcher	-.031	4	NO	NO	2	2
M72 Light Anti-tank Weapon (LAW)						
Inspect/Prepare to Fire	-.071	12	NO	YES	2	3
Restore Launcher	-.060	6	NO	YES	2	3
M16 Rifle Disassemble/ Assemble	-.062	10	YES	YES	1	1
Communications Check	-.06	3	NO	NO	3	3

\*"GO RATE" over time since training

TABLE 12

Correlations Between Slope of the Percent "GO" Decay Functions  
and the Predictor Variables

	Slope	Steps	Safety Procedures	Subtasks	Order of Training
Slope % GO Decay					
Number of Task Steps	.55				
Safety Procedure Steps	.25	.40			
Subtask Structure	.41	.37	-.30		
Order of Training	.39	-.08	.24	-.44	
Number of Training Exposures	.34	.01	.15	-.46	.86

Number of steps has the highest correlation with the dependent variable-slope. Its small coefficient relative to the other variables in the equation is a result of its larger variance and greater values, not its importance in the equation.

Given the above equation, one can make predictions about the rate of skill decay for other procedural tasks. For example, we would predict that a task with 10 steps, no subtasks, taught second relative to other tasks would have a decrement in percent "GO" slope of -5.5% a month. In general, procedural tasks that have few steps, are, uncomplicated, and are taught early in the course of instruction would have the shallowest decay functions and the greatest likelihood of being performed correctly at some time after training.

#### Mean Percent of Performance Measures Passed

In most cases, soldiers who received "NO GO" for a task had successfully completed many of the performance measures. Appendix A presents the percent "GO" for each task step or performance measure. We computed another set of regression equations, with proportion of performance measures passed or "GO" as the dependent variable and time since training the independent variable. The results for soldiers who did not receive coaching are summarized in Table 13. The slopes represent the percent decrease in proportion of performance steps correct per month. With the exception of the defensive position tasks, at the end of twelve months, all tasks had regression lines indicating more than forty percent of the performance measures being passed. So, although many soldiers may not be able to perform tasks well enough to receive a "GO" for the entire task, there generally is a good base of knowledge on which to rebuild skills.

#### Types of Performance Measures Missed

On each task, soldiers all tended to make the same errors. A Guttman coefficient of reproducibility was computed for each task for the no coaching group (Table 14). A coefficient of reproducibility is a measure of the extent to which soldiers' patterns of errors on task steps conform to a Guttman scale. In a Guttman scale, the component task steps can be ordered by degree of difficulty. Soldiers who score a "GO" to a difficult step received "GO's" to all less difficult step and received "NO GO's" to all more difficult steps. A high coefficient of reproducibility indicates that the task step errors are cumulative and consistent across the sample. A high coefficient of reproducibility indicates that all soldiers making two errors tend to miss the same two steps and that these steps are consistently the most difficult to perform correctly. The coefficients reported here show a high degree of consistency in soldiers' errors. Generally, they missed steps that most require memory. Errors occurred frequently on steps that were judged to be either not suggested by the piece of equipment, or by the previous sequence of

TABLE 13

Linear Regression Coefficients:  
 "Percent Performance Measures Passed" With Time Since Training

<u>TASK</u>	<u>SLOPE</u>	<u>CONSTANT</u>	<u>R<sup>2</sup></u>
Cardiopulmonary Resuscitation	-.024	.974	.27
Stop Bleeding	-.033	.956	.37
Challenge and Password			
One Man Approaches	-.013	.981	.11
Group Approaches	-.017	.989	.32
Report Enemy Information			
Size/Activity/Location	-.007	.969	.11
Unit/Time/Equipment	-.017	.973	.02
Don Gas Mask	-.027	.949	.14
M60 Machine Gun			
Load/Fire	-.050	.959	.48
Reduce Stoppage	-.047	.995	.35
Unload/Clear	-.054	.971	.41
M203 Grenade Launcher			
Disassemble/Assemble	-.050	1.00	.47
Load/Fire	-.030	.998	.25
Reduce Stoppage	-.041	1.02	.40
Clear Launcher	-.039	1.00	.27
M72 Light Anti-tank Weapon (LAW)			
Inspect/Prepare to Fire	-.035	.993	.39
Restore Launcher	-.040	1.00	.34
M16 Rifle Disassemble/Assemble	-.018	.953	.13
Communications Check	-.043	.889	.39

TABLE 14  
Guttman Coefficients of Reproducibility

<u>TASK</u>	
Cardiopulmonary Resuscitation	.985
Stop Bleeding	.831
Challenge and Password	
One Man Approaches	.923
Group Approaches	.930
Report Enemy Information	
Size/Activity/Location	.952
Unit/Time/Equipment	.972
Don Gas Mask	.974
Individual Defensive Position - Outline	.879
Individual Defense Position - Describe	.817
M60 Machine Gun	
Load/Fire	.927
Reduce Stoppage	.914
Unload/Clear	.879
M203 Grenade Launcher	
Disassemble/Assemble	.984
Load/Fire	.995
Reduce Stoppage	.978
Clear Launcher	1.00
M72 Light Anti-tank Weapon (LAW)	
Inspect/Prepare to Fire	.948
Restore Launcher	.951
M16 Rifle Disassemble/Assemble	.973
Communications Check	.905

steps. Frequently, errors occurred on safety procedures. Examples are failing to clear weapons and not checking an M72LAW backblast area. There also was a tendency for subtasks not to be performed; for example, a number of soldiers did not perform mouth-to-mouth resuscitation after completing the cardiac massage phase of the Cardiopulmonary-Resuscitation task.

### Coaching

The coaching administered to half the sample prior to testing had little effect on performance of most tasks. A stepwise multiple regression was performed for each task with coaching included as a potential predictor of "GO RATE." Coaching added significantly to the prediction equation for five of the twenty tasks. These tasks were Load/Fire M203 Grenade Launcher, M203 Grenade Launcher Fails to Fire, Disassemble/Assemble M203 Grenade Launcher, Outline a Defensive Position, and Report Enemy Information UTE from keyword SALUTE. Even for these tasks, correlations between tasks' "GO RATE" and coaching are low (Table 15). In no case did the performance of the coached group approach performance of baseline soldiers.

Coaching also had little effect on the proportion of performance measures passed. Table 16 presents the correlation coefficients for this variable with coaching. Again the correlations are consistently low.

TABLE 15

## Correlation of Percent "GO" with Coaching

<u>TASK</u>	
Cardiopulmonary Resuscitation	-.08
Stop Bleeding	.14
Challenge and Password One Man Approaches	.10
Challenge and Password Group Approaches	.03
Report Enemy Information Size/Activity/Location	.13
Report Enemy Information Unit/time/Equipment	.23*
Don Protective Mask	.01
Individual Defensive position - Outline	.31*
Individual Defensive Position - Describe	.14
M60 Machine Gun - Load/Fire	.00
M60 Machine Gun - Reduce Stoppage	.03
M60 Machine Gun - Unload/Clear	.11
M203 Grenade Launcher - Disassemble/Assemble	.22
M203 Grenade Launcher - Load/Fire	.20
M203 Grenade Launcher - Reduce Stoppage	.39**
M203 Grenade Launcher - Clears	-.12
M72 Light Anti-tank Weapon (LAW) Inspect/Fire	.15
M72 LAW - Restore	.08
M16 Rifle - Disassemble/Assemble	.07
Communications Check	.05

\*P&lt;.05

\*\*P&lt;.01

TABLE 16

## Correlation of Mean Percent Performance Measures Passed with Coaching

<u>TASK</u>	
Cardiopulmonary Resuscitation	.07
Stop Bleeding	.09
Challenge and Password One Man Approaches	.17
Challenge and Password Group Approaches	.05
Report Enemy Information Size/Activity/Location	.16
Report Enemy Information Unit/Time/Equipment	.15
Don Protective Mask	-.10
Individual Defensive Position - Outline	.33**
Individual Defensive Position - Describe	.17
M60 Machine Gun - Load/Fire	.07
M60 Machine Gun - Reduce Stoppage	.07
M60 Machine Gun - Unload/Clear	.19*
M203 Grenade Launcher - Disassemble/Assemble	.12
M203 Grenade Launcher - Load/Fire	.19
M203 Grenade Launcher - Reduce Stoppage	.25*
M203 Grenade Launcher - Clears	.02
M72 Light Anti-tank Weapon (LAW) Inspect/Fire	.16*
M72 LAW - Restore	.16*
M16 Rifle - Disassemble/Assemble	-.04
Communications Check	.05

\*P &lt; .05

\*\*P &lt; .01



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## APPENDIX A

### TASKS AND TASK STEPS TESTED

#### BASIC SKILLS RETENTION

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##### FIRST AID - CPR - CARDIOPULMONARY RESUSCITATION

<u>PERFORMANCE STEPS</u>	<u>PERCENT GO*</u>
1. Positions victim on back	100
2. Tilts head back, one hand on forehead, one under neck	93
3. Positions close to victim's side	93
4. Places heel of hand on lower half breastbone	90
5. Spreads and raises fingers of hand	86
6. Places other hand on top of first	86
7. Brings shoulders over victim's breastbone keeping arms straight	86
8. Presses downward 1½ to 2 inches	86
9. Releases pressure immediately	86
10. Does not remove hands	73
11. <u>AFTER 15 COMPRESSIONS PLACE HAND BEHIND NECK</u>	45
12. <u>PINCHES NOSTRILS TOGETHER WITH OTHER HAND</u>	45
13. <u>TILTS VICTIM'S HEAD BACK, BLOWS 2 BREATHS</u>	45
14. <u>RATIO OF HEART PUMPS TO BREATHE</u>	50

\* No coaching, no practice since training soldiers

## BASIC SKILLS RETENTION

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### FIRST AID - CONTROLS THE BLEEDING, PROTECTS THE WOUND, AND PREVENTS SHOCK

<u>PERFORMANCE STEPS</u>	<u>PERCENT GO</u>
1. Places white part of field dressing on wound	100
2. Places hand over the dressing	84
3. Presses hard until bleeding stops	76
4. <u>HOW LONG TO APPLY PRESSURE TO STOP BLEEDING?</u>	40
5. Ties tails of dressing over wound	84
6. How to provide additional protection for wound?	84
7. Elevates feet	60
8. <u>LOOSENS VICTIM'S CLOTHING</u>	36
9. Covers victim to keep him warm (with pancho)	76

## BASIC SKILLS RETENTION

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### CHALLENGE AND PASSWORD - ONE MAN-CORRECT PASSWORD

<u>PERFORMANCE STEPS</u>	<u>PERCENT GO</u>
1. Stranger approaches, trainee to be heard, commands the person to HALT	100
2. Stranger halts, trainee keeps position	97
3. Keeps stranger covered	94
4. <u>ASKS "WHO IS THERE"?</u>	79
5. <u>STRANGER IDENTIFIES SELF, TRAINEE ORDERS,</u> <u>"ADVANCE TO BE RECOGNIZED"</u>	71
6. Stranger advances, trainee keeps position	81
7. Keeps stranger covered	88
8. Orders "halt" when stranger is within 2-3 meters	71
9. Issues challenge softly	91
10. Waits for password from stranger	88

## BASIC SKILLS RETENTION

---

### CHALLENGE AND PASSWORD - GROUP-CORRECT PASSWORD

<u>PERFORMANCE STEPS</u>	<u>PERCENT GO</u>
1. Group approaches, trainee to be heard, commands "halt"	100
2. Group halts, trainee keeps his position	100
3. Keeps group covered	93
4. Asks "who is there"	86
5. <u>LEADER IDENTIFIES GROUP, TRAINEE ORDERS,</u> <u>"ADVANCE ONE MAN TO BE RECOGNIZED"</u>	51
6. Leader advances, trainee keeps position	95
7. Keeps stranger covered	95
8. Orders "halt" when stranger is within 2-3 meters	91
9. Issues challenge softly	98
10. Waits for password which stranger does give	98
11. <u>HAS EACH MAN PASS INDIVIDUALLY</u>	56
12. <u>HAS LEADER IDENTIFY EACH MAN</u>	56

## BASIC SKILLS RETENTION

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### REPORT ENEMY INFORMATION - IDENTIFIES THE SAL COMPONENTS

<u>PERFORMANCE STEPS</u>	<u>PERCENT GO</u>
1. <u>Size</u> : how many enemy personnel?	90
2. <u>Activity</u> : what were they doing?	79
3. <u>Location</u> : where were they? direction and distance	86

### REPORT ENEMY INFORMATION - IDENTIFIES THE UTE COMPONENTS

<u>PERFORMANCE STEPS</u>	<u>PERCENT GO</u>
1. <u>Unit</u> : any unit markings?	87
2. <u>Time</u> : when was this activity?	98
3. <u>Equipment</u> : what equipment was involved?	94

## BASIC SKILL RETENTION

### NBC DEFENSE - TAKES PROTECTIVE MEASURES AGAINST CHEMICAL

#### HAZARDS (DONS GAS MASK)

<u>PERFORMANCE STEPS</u>	<u>PERCENT GO</u>
1. Stops breathing	85
2. Places weapon between legs	81
3. Removes headgear with right hand	85
4. Opens mask carrier with left hand	85
5. Places headgear on weapon	81
6. Removes mask from carrier	85
7. Opens mask fully	74
8. Places chin in chin pocket	66
9. Pulls on head harness	77
10. <u>CLEARs MASK</u>	46
11. Checks for leaks	69
12. Gives alarm "gas"	73
13. Replaces headgear	81
14. Closes carrier	85
15. <u>COMPLETES WITHIN 9 SECONDS</u>	23

## BASIC SKILLS RETENTION

### INDIVIDUAL DEFENSIVE POSITION - OUTLINE A DEFENSIVE POSITION

<u>PERFORMANCE STEPS</u>	<u>PERCENT GO</u>
1. Indicates trenched area 2 helmets wide	49
2. Indicates central trench 2 M16A1 long	72
3. Indicates 2 flanking trenches each 1 M16A1 long	44
4. Indicates parapet 1 M16A1 wide	26
5. Indicates area 1 helmet wide between foxhole and parapet	19

### INDIVIDUAL DEFENSIVE POSITION - EXPLAINS THE COMPLETION OF A DEFENSIVE POSITION

OVERALL GO RATE 22%  
PERFORMANCE STEPS

<u>PERFORMANCE STEPS</u>	<u>PERCENT GO</u>
1. States depth of foxhole is to armpits	67
2. States parapet is 12-18 inches high	46
3. Would clear sectors of fire	41
4. Would place sector-of-fire limits	35
5. Would camouflage parapet	39



## BASIC SKILLS RETENTION

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### M60 MACHINE GUN - LOADS WEAPON AND FIRES

<u>PERFORMANCE STEPS</u>	<u>PERCENT GO</u>
1. <u>PLACES SAFETY ON FIRE</u>	35
2. <u>PULLS BOLT TO REAR</u>	35
3. <u>RETURNS COCKING HANDLE TO FORWARD POSITION</u>	35
4. <u>PUTS SAFETY ON SAFE</u>	22
5. <u>RAISES COVER, ASSURES THAT FEEDWAY, RECEIVER, AND CHAMBER ARE CLEAR</u>	42
6. Places first round of belt into feed tray groove	73
7. Closes cover	85
8. Puts safety on fire	76
9. Aims and fires	89

## BASIC SKILLS RETENTION

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### M60 MACHINE GUN - REDUCES A STOPPAGE

<u>PERFORMANCE STEPS</u>	<u>PERCENT GO</u>
1. Waits 5 seconds for cook-off	52
2. Pulls the cocking handle to the rear	72
3. Observes for an ejected round	64
4. Returns handle to the forward position	64

## BASIC SKILLS RETENTION

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### M60 MACHINE GUN - UNLOADS AND CLEARS THE WEAPON

<u>PERFORMANCE STEPS</u>	<u>PERCENT GO</u>
1. Pulls the bolt to rear	58
2. <u>PLACES SAFETY ON SAFE</u>	46
3. Returns cocking handle to forward position	56
4. Raises feed cover	72
5. Removes ammunition or links from feed tray	65
6. Checks cover, feed tray, and chamber to insure they are clear	56
7. Closes cover	63
8. Places safety on FIRE position	46
9. <u>PULLS TRIGGER</u>	46
10. <u>WHILE EASING BOLT FORWARD</u>	40
11. <u>PLACES SAFETY ON "SAFE"</u>	42

## BASIC SKILLS RETENTION

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### M203 GRENADE LAUNCHER - DISASSEMBLE/ASSEMBLE THE WEAPON

<u>PERFORMANCE STEPS</u>	<u>PERCENT GO</u>
1. <u>LOOSENS MOUNTING SCREW OF QUADRANT</u>	24
<u>SIGHT ASSEMBLY</u>	
2. Depresses barrel latch	78
3. Slides barrel assembly forward	78
4. Counts back from M16A1 muzzle to the fourth hole on left side of handguard	73
5. Inserts one end of a section of cleaning rod into hole	73
6. Depresses barrel stop	73
7. Slides barrel assembly off receiver track	71
8. Slides barrel assembly onto receiver barrel stop engages	68
9. <u>TIGHTENS MOUNTING SCREW OF QUADRANT SIGHT</u>	49
<u>ASSEMBLY CLAMP</u>	

## BASIC SKILLS RETENTION

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### M203 GRENADE LAUNCHER - LOADS AND FIRES

<u>PERFORMANCE STEPS</u>	<u>PERCENT GO</u>
1. Clears launcher	63
2. Insures safety on SAFE	59
3. Depresses the barrel latch	80
4. Slides the barrel forward	80
5. Fully inserts the round into the barrel	80
6. Slides barrel rearward	80
7. Locks the barrel to the breech	80
8. Puts the safety to FIRE	80
9. Aims and fires	78

## BASIC SKILLS RETENTION

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### M203 GRENADE LAUNCHER - PERFORMS FAILURE TO FIRE PROCEDURES

<u>PERFORMANCE STEPS</u>	<u>PERCENT GO</u>
1. <u>SHOUTS "MISFIRE"</u>	32
2. Keeps weapon pointed downrange	24
3. <u>WAITS 30 SECONDS FROM TIME OF MISFIRE</u>	62
4. Opens breech	22
5. Unloads weapon	22
6. Examines primer	22
7. <u>Question:</u> if primer is not dented, what is at fault?	30
8. Slides the barrel rearward	22
9. Locks the barrel to the breech	22
10. Places safety on SAFE	24

## BASIC SKILLS RETENTION

---

### M203 GRENADE - CLEARS THE WEAPON

<u>PERFORMANCE STEPS</u>	<u>PERCENT GO</u>
1. Keeps weapon pointed downrange	73
2. Depresses the barrel latch	70
3. Slides the barrel forward	70
4. Checks the breech to insure no round is present	70
5. Slides the barrel rearward	70
6. Locks the barrel to the breech	70
7. Places the safety on SAFE	70

## BASIC SKILLS RETENTION

---

### M72A2LAW - INSPECTS AND PREPARES TO FIRE

<u>PERFORMANCE STEPS</u>	<u>PERCENT GO</u>
1. Inspects LAW to insure all seals intact, and tube not cracked, punctured, or crushed	87
2. Insures pull pin in place	86
3. Insures trigger safety handle in place	83
4. Faces in general direction of target	83
5. <u>Inspects to assure that backblast area is clear of personnel</u>	39
6. Removes pull pin	84
7. Rotates cover downward	84
8. Sharply extends launcher until it locks into place	78
9. <u>Rechecks backblast areas</u>	41
10. Places launcher on shoulder	84
11. Supports outer tube with nonfiring palm up	68
12. Moves safety to arm	64



## BASIC SKILLS RETENTION

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### M72A2LAW - RESTORES LAUNCHER

<u>PERFORMANCE STEPS</u>	<u>PERCENT GO</u>
1. <u>RETURNS TRIGGER SAFETY HANDLE TO SAFE</u>	57
2. Keeps launcher trained down range	75
3. Takes launcher off shoulder	81
4. Depresses barrel detent and collapses launcher tube	72
5. Restores front sights	65
6. Restores rear sights	78

## BASIC SKILLS RETENTION

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### M16A1 RIFLE - DISASSEMBLES/ASSEMBLES RIFLE

<u>PERFORMANCE STEPS</u>	<u>PERCENT GO</u>
1. <u>CLEARs RIFLE</u>	27
2. Separates upper and lower receiver groups	93
3. Removes bolt carrier group (do not disassemble)	100
4. Removes buffer assembly	73
5. Removes action spring	73
6. Replaces buffer assembly	73
7. Replaces action spring	73
8. Replaces bolt carrier group	100
9. Assembles upper and lower receiver groups	93
10. Replaces magazine	100

## BASIC SKILLS RETENTION

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### FIELD COMMUNICATIONS - PERFORMS OPERATIONAL CHECK

#### PERFORMANCE STEPS

#### PERCENT GO

- |   |    |
|---|----|
| 1. Installs batteries in telephone correctly<br>one positive end up and one positive end down   | 71 |
| 2. Checks proper operation of transmitter,<br>receiver and push-to-talk switch by pressing<br>push-to-talk switch in and speaks to self | 70 |
| 3. <u>CHECKS PROPER RINGING BY TURNING THE HAND-<br/>CRANK GENERATOR RAPIDLY</u>  | 61 |

APPENDIX B  
RETENTION OF BASIC SKILLS BACKGROUND QUESTIONNAIRES

**DATA REQUIRED BY THE PRIVACY ACT OF 1974**  
(5 U.S.C. 552a)

<b>TITLE OF FORM</b>		<b>PRESCRIBING DIRECTIVE</b>
Retention of Basic Skills Background Questionnaire		AR 70-1
<b>1. AUTHORITY</b>		
10 USC Sec 4503		
<b>2. PRINCIPAL PURPOSE(S)</b>		
The data collected with the attached form are to be used for research purposes only.		
<b>3. ROUTINE USES</b>		
<p>This is an experimental personnel data collection form developed by the U.S. Army Research Institute for the Behavioral and Social Sciences pursuant to its research mission as prescribed in AR 70-1. When identifiers (name or Social Security Number) are requested they are to be used for administrative and statistical control purposes only. Full confidentiality of the responses will be maintained in the processing of these data.</p>		
<b>4. MANDATORY OR VOLUNTARY DISCLOSURE AND EFFECT ON INDIVIDUAL NOT PROVIDING INFORMATION</b>		
<p>Your participation in this research is strictly voluntary. Individuals are encouraged to provide complete and accurate information in the interests of the research, but there will be no effect on individuals for not providing all or any part of the information. This notice may be detached from the rest of the form and retained by the individual if so desired.</p>		

**FORM**

**Privacy Act Statement - 28 Sep 78**

DA Form 4308-R, 1 May 78

Name \_\_\_\_\_

**Last**

**First**

**Middle**

**Test ID Number**

## Station 1

(Tester's Initials)

## Station 2

### Station 3

### Station 4

### Station 5

## Station 6

### Station 7

### Station 8

### Station 9

### Station 10

OSUT Graduates Only (MOS 13B)

OSUT STA 1

OSUT STA 2

OSUT STA 3

Test ID Number                      (1-3)

1. Name \_\_\_\_\_

2. Social Security Number \_\_\_\_\_ - \_\_\_\_\_ - \_\_\_\_\_ (4-12)

3. What is your grade?

E-1 \_\_\_\_\_ E-2 \_\_\_\_\_ E-3 \_\_\_\_\_ E-4 \_\_\_\_\_ E-5 \_\_\_\_\_ (13)

(1) (2) (3) (4) (5)

4. How old are you?

17-18 \_\_\_\_\_ 19-20 \_\_\_\_\_ 21-22 \_\_\_\_\_ 23 or above \_\_\_\_\_ (14)

(1) (2) (3) (4)

5. What is your highest level of education? (Check one) (15)

\_\_\_\_\_ (1) Some High School

\_\_\_\_\_ (2) GED Diploma

\_\_\_\_\_ (3) High School Graduate

\_\_\_\_\_ (4) Some College

\_\_\_\_\_ (5) College Graduate

6. What is your primary MOS?

\_\_\_\_\_ (16-20)

7. How long have you held your primary MOS?

\_\_\_\_\_ Months (21-22)

8. Check the training you have received.

Basic Training/AIT \_\_\_\_\_ MOS Awarded \_\_\_\_\_ (23)

(1)

One Station Unit Training \_\_\_\_\_

(2)

9. What month did you graduate from either Basic Training or OSUT? (24-25)

(1) May, 1977 (7) Nov., 1977 (13) May, 1977

(2) June, 1977 (8) Dec., 1977

(3) July, 1977 (9) Jan., 1978

(4) Aug., 1977 (10) Feb., 1978

(5) Sept., 1977 (11) Mar., 1978

(6) Oct., 1977 (12) April, 1978

53

10. Present Duty Position \_\_\_\_\_ (26)
11. How long have you been assigned to your present battery?  
\_\_\_\_\_ Months (27-28)
12. Do you still have your copy of the "Variable Test Package"?  
Yes \_\_\_\_\_ No \_\_\_\_\_ (29)  
      (1)               (2)
13. Do you have your own copy of a Soldier's Manual?  
Yes \_\_\_\_\_ No \_\_\_\_\_ (30)  
      (1)               (2)
14. What unit did you belong to during either Basic Training  
or OSUT?  
Battery \_\_\_\_\_ Battalion (31-32)

# INSTRUCTIONS FOR ANSWERING THE QUESTIONS ON THE NEXT PAGES

Some tasks that are trained during Basic Training or OSUT are listed on the next pages. Next to each task are answers for three (3) questions. Please circle the three (3) answers which best describes your answer to each question for each task.

For Example:

## TASKS

1. Clear the airway, restore heart beat and breathing, and prevent shock.

## QUESTIONS

How many times have you trained on this task since leaving Basic Training or OSUT?

- A. 0
- B. 1-4
- ☒ C. 5-10
- D. 11-15
- E. more than 15

Not counting during OSUT or Basic Training, when did you last train on this task?

- A. never
- B. last summer
- C. last fall
- ☒ D. last winter
- E. this spring

How well can you perform this task?

- A. not familiar with task
- B. not very well
- ☒ C. fairly well
- D. very well



PLEASE CIRCLE THE THREE (3) ANSWERS WHICH BEST DESCRIBES YOUR RESPONSE TO EACH QUESTION FOR EACH TASK

# TASKS

## QUESTIONS

How many times have you trained on this task since leaving Basic Training or OSUT?

Not counting during OSUT or Basic Training, when did you last train on this task?

How well can you perform this task?

1. Clear the airway, restore heart beat and breathing, and prevent shock. (33-35) A. 0 B. 1-4 C. 5-10 D. 11-15 E. more than 15

- A. not familiar with task
- B. not very well
- C. fairly well
- D. very well

2. Control breathing, protect the wound, and prevent shock. (36-38) A. 0 B. 1-4 C. 5-10 D. 11-15 E. more than 15

- A. not familiar with task
- B. not very well
- C. fairly well
- D. very well

3. Apply tourniquet and prevent shock. (39-41) A. 0 B. 1-4 C. 5-10 D. 11-15 E. more than 15

- A. not familiar with task
- B. not very well
- C. fairly well
- D. very well

4. Splint a fracture and prevent shock. (42-44) A. 0 B. 1-4 C. 5-10 D. 11-15 E. more than 15

- A. not familiar with task
- B. not very well
- C. fairly well
- D. very well

5. Use proper challenge and password procedures when approached by a soldier who gives correct password. (45-47) A. 0 B. 1-4 C. 5-10 D. 11-15 E. more than 15

- A. not familiar with task
- B. not very well
- C. fairly well
- D. very well

PLEASE CIRCLE THE THREE (3) ANSWERS WHICH BEST DESCRIBES YOUR RESPONSE TO EACH QUESTION FOR EACH TASK

# TASK3

## QUESTIONS

How many times have you trained on this task since leaving Basic Training or OSUT?

Not counting during OSUT or Basic Training, when did you last train on this task?

How well can you perform this task?

6. Use proper challenge and password procedures when approached by a soldier who gives incorrect password.

A. never  
B. last summer  
C. last fall  
D. last winter  
E. this spring

A. not familiar with task  
B. not very well  
C. fairly well  
D. very well

7. Outline defensive position complete a defensive position.

A. never  
B. last summer  
C. last fall  
D. last winter  
E. this spring

A. not familiar with task  
B. not very well  
C. fairly well  
D. very well

8. Take protective measures against nuclear hazards/mark nuclear hazards.

A. never  
B. last summer  
C. last fall  
D. last winter  
E. this spring

A. not familiar with task  
B. not very well  
C. fairly well  
D. very well

9. Take protective measures against biological hazards/mark biological hazards.

A. never  
B. last summer  
C. last fall  
D. last winter  
E. this spring

A. not familiar with task  
B. not very well  
C. fairly well  
D. very well

10. Take protective measures against chemical hazards/mark chemical hazards.

A. never  
B. last summer  
C. last fall  
D. last winter  
E. this spring

A. not familiar with task  
B. not very well  
C. fairly well  
D. very well

PLEASE CIRCLE THE THREE (3) ANSWERS WHICH BEST DESCRIBES YOUR RESPONSE TO EACH QUESTION FOR EACH TASK

TASK

QUESTIONS

- |  | How many times have you trained on this task since leaving Basic Training or OSUT? | Not counting during OSUT or Basic Training, when did you last train on this task? | How well can you perform this task?   |
|--|--|---|---|
| 11. Report enemy information. (63-65)  | A. 0<br>B. 1-4<br>C. 5-10<br>D. 11-15<br>E. more than 15                           | A. never<br>B. last summer<br>C. last fall<br>D. last winter<br>E. this spring    | A. not familiar with task<br>B. not very well<br>C. fairly well<br>D. very well |
| 12. Load/engage target/reduce a stoppage/unload and clear (66-68) M60 machine gun.                   | A. 0<br>B. 1-4<br>C. 5-10<br>D. 11-15<br>E. more than 15                           | A. never<br>B. last summer<br>C. last fall<br>D. last winter<br>E. this spring    | A. not familiar with task<br>B. not very well<br>C. fairly well<br>D. very well |
| 13. Conduct prefire safety inspection of M72A2 LAW/prepare launcher for firing/restore the launcher. | A. 0<br>B. 1-4<br>C. 5-10<br>D. 11-15<br>E. more than 15                           | A. never<br>B. last summer<br>C. last fall<br>D. last winter<br>E. this spring    | A. not familiar with task<br>B. not very well<br>C. fairly well<br>D. very well |
| 14. Assemble/disassemble the M203 Grenade Launcher.  | A. 0<br>B. 1-4<br>C. 5-10<br>D. 11-15<br>E. more than 15                           | A. never<br>B. last summer<br>C. last fall<br>D. last winter<br>E. this spring    | A. not familiar with task<br>B. not very well<br>C. fairly well<br>D. very well |
| 15. Load/engage target/performance failure to fire procedures/unload/clear M203 Grenade Launcher.    | A. 0<br>B. 1-4<br>C. 5-10<br>D. 11-15<br>E. more than 15                           | A. never<br>B. last summer<br>C. last fall<br>D. last winter<br>E. this spring    | A. not familiar with task<br>B. not very well<br>C. fairly well<br>D. very well |

PLEASE CIRCLE THE THREE (3) ANSWERS WHICH BEST DESCRIBES YOUR RESPONSE TO EACH QUESTION FOR EACH TASK

# TASKS

## QUESTIONS

TASKS	How many times have you trained on this task since leaving Basic Training or OSUT?	Not counting during OSUT or Basic Training, when did you last train on this task?	How well can you perform this task?
16. Load/unload/clear M16A1 rifle, engage target, reduce stoppage.	(13-15) A. 0 B. 1-4 C. 5-10 D. 11-15 E. more than 15	A. never B. last summer C. last fall D. last winter E. this spring	A. not familiar with task B. not very well C. fairly well D. very well
17. Disassemble/assemble/perform function check on M16A1 rifle.	(16-18) A. 0 B. 1-4 C. 5-10 D. 11-15 E. more than 15	A. never B. last summer C. last fall D. last winter E. this spring	A. not familiar with task B. not very well C. fairly well D. very well
18. Adjust sights for battle sight zero.	(19-21) A. 0 B. 1-4 C. 5-10 D. 11-15 E. more than 15	A. never B. last summer C. last fall D. last winter E. this spring	A. not familiar with task B. not very well C. fairly well D. very well
19. Perform operator checks and services on field telephone TA312/PT.	(22-24) A. 0 B. 1-4 C. 5-10 D. 11-15 E. more than 15	A. never B. last summer C. last fall D. last winter E. this spring	A. not familiar with task B. not very well C. fairly well D. very well
20. Install wire communications.	(25-27) A. 0 B. 1-4 C. 5-10 D. 11-15 E. more than 15	A. never B. last summer C. last fall D. last winter E. this spring	A. not familiar with task B. not very well C. fairly well D. very well

## APPENDIX C

### Linear Regression Coefficients

Linear Regression Coefficients: "GO RATE" With Time Since Training

<u>TASK</u>	<u>SLOPE</u>	<u>CONSTANT</u>	<u>R<sup>2</sup></u>
Cardiopulmonary Resuscitation	-.065	.80	.21
Stop Bleeding	-.085	.78	.35
Challenge and Password			
One Man Approaches	-.051	.948	.25
Group Approaches	-.079	.952	.50
Report Enemy Information			
Size/Activity/Location	-.028	.952	.11
Unit/Time/Equipment	-.014	.933	.03
Don Gas Mask	-.079	.79	.21
M60 Machine Gun			
Load/Fire	-.085	.859	.53
Reduce Stoppage	-.076	.969	.42
Unload/Clear	-.079	.899	.47
M203 Grenade Launcher			
Disassemble/Assemble	-.098	.985	.70
Load/Fire	-.040	.901	.17
Reduce Stoppage	-.079	.947	.54
Clear Launcher	-.031	.947	.19
M72 Light Anti-tank Weapon (LAW)			
Inspect/Prepare to Fire	-.071	.794	.32
Restore Launcher	-.060	.962	.35
M16 Rifle Disassemble/Assemble	-.062	.88	.26
Communications Check	-.06	.951	.33

#### General Linear Formula

$$Y = (\text{slope})X + \text{Constant}$$

where:

Y = predicted percent GO

X = time since training in months

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# DISTRIBUTION

## ARI Distribution List

4 OASD (M&RA)  
 2 HQDA (DAMI-CSZ)  
 1 HQDA (DAPE-PBR)  
 1 HQDA (DAMA-AR)  
 1 HQDA (DAPE-HRE-PO)  
 1 HQDA (SGRD-ID)  
 1 HQDA (DAMI-DOT-C)  
 1 HQDA (DAPC-PMZ-A)  
 1 HQDA (DACH-PPZ-A)  
 1 HQDA (DAPE-HRE)  
 1 HQDA (DAPE-MPO-C)  
 1 HQDA (DAPE-DWI)  
 1 HQDA (DAPE-HRL)  
 1 HQDA (DAPE-CPS)  
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